

Servotron User Manual

For Version S 3.26E

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Overview

The Servotron is a fully integrated labelling head controller for Impresstik Labelling Machines. It includes a 400W servodrive to control the web drive servomotor. All of the adjustments are made with three pushbuttons on the front panel. There is a two line by twenty-character LCD display for viewing the settings. Settings can also be adjusted via a serial port if this option is installed.

Note: As major menu structure changes were implemented in Version 3.26 & 3.15 please use the 3.25 & 3.14B version of the manual for those versions and earlier. From Version 3.26 on there is also the option to select a simple or reduced menu set. The menus that are still included when this option is selected are shown here marked 'Simple'.

Menu Structure

InStep 2 Ver S 3.26
By Industronics

This is the opening screen. If Enter is pressed and held during this screen, the controller will display the initialisation menu. Refer to the end of this section for details.

If Enter is not pressed the following menu is displayed after a ten second delay:

Level One Menus

Label Dispenser
is on

Simple

Pressing Enter cycles between "on" and "off". This menu is provided to allow for re-enabling after an ignored fault or to disable so that the product sensor is ignored or the drive roller can be turned by hand. Pressing the down arrow displays the following screen:

Single Label Release
Press Enter to Start

Simple

Pressing Enter starts a labelling cycle. Pressing the down arrow displays the following screen:

Label Position
0

Simple

The Label Position setting is displayed here. This sets the delay in steps between the product sensor activation and the start of dispense effectively changing the position of the label on the product. Press Enter to enter Edit Mode, a flashing arrow is displayed to the right of the value when in edit mode. Whilst in edit mode the arrow keys can be used to adjust the value. When the correct value is displayed press Enter to leave Edit Mode. Whilst not in edit mode pressing the arrow keys moves to another menu item. Pressing the down arrow displays the following screen:

Label Advance (Web)
100

Or

Fixed Move Length
100

Simple

This is the second menu in level one. The Label Advance or the Fixed Move length setting is displayed here. Which is displayed is determined by bit 0 in the Option 2 menu in level three. The label advance menu sets the number of steps to move after the gap sensor has activated. If the deceleration is adjusted, this value must be entered again to subtract the deceleration steps from the entered advance value. The fixed move length menu sets the total length of the fixed move when that mode is selected. Both of these menus use the same memory location for value storage, so changing one changes the other.

Label Counter
0

Simple

The Label Counter is displayed here. This shows the total number of labels dispensed since the last count reset. Pressing Enter will reset the label count. As at Version 3.18 if the counter memory option is installed and enabled in Option2 menu the count will be retained through a power down otherwise it is lost. As of V3.26 pressing enter brings up a second screen to confirm the resetting of the counter. Pressing the down arrow displays the following screen:

Other menus may appear here. These can be: “Two Label Spacing” together with “2 Label 1st Advance” and/or “Jig Delay” together with “Jig Hold Delay” and/or “Spin Up Delay” and/or “Air Blast Time” in this order. They appear here in the top level menu when they are enabled and down in the second level if disabled. This allows the menus to self-customise to the application and prevents clutter of the top level menu. Refer to the appropriate menus in the second level for further details.

Sync Ratio	128
------------	-----

Simple

If the sync ratio has been set to 255 to ignore the master encoder, the Set Speed menu will be shown here otherwise the Sync Ratio setting is displayed here. This sets the sync ratio between the master encoder and the output pulse rate, 0 is 50%, 239 is 800%. A value of 255 causes the master encoder to be ignored and the set speed value to take effect. Always use 255 in a converted Monitor as no encoder connection is present. Pressing the down arrow displays the following screen:

Other menus may appear here. This depends on the option card that has been fitted and which options have been enabled. Refer to the appropriate option manual for further details. This will not happen if simple menu is selected. Otherwise pressing the down arrow displays the following screen:

Level Two Menu

Simple

Pressing the down arrow rolls around to the “Label Counter” menu. Pressing Enter takes you to level two menus and displays the following screen:

Level Two Menu

End of Reel Count	3	3
-------------------	---	---

Simple

How the “end of reel count” functions is determined by a bit in the Option2 menu. With this bit on, the setting here is the number of labels that can be dispensed in between operations of the ‘end of reel’ sensor. The sensor detects the movement of the label reel. In this mode, the number set here is usually quite low. With the bit off, it sets the number of labels that can be dispensed while the ‘end of reel’ sensor is on. The sensor detects that the label reel is low in diameter. The setting is usually larger in order to allow the reel to become very close to finished before the head stops. In both modes, the setting depends on the label length. The number on the left is the actual count. It is a ‘live’ value and is provided to assist in establishing the correct setpoint. Pressing the down arrow displays the following screen:

Set Speed	0
-----------	---

Simple

If the sync ratio has been set to 255 to ignore the master encoder, the Sync Ratio menu will be shown here otherwise the Set Speed setting is displayed here. This is the dispense speed when no master encoder is used, i.e. Sync Ratio set to 255. Values less than 5000 give a very slow dispense speed, while values approaching 9999 give a very fast speed. Pressing the down arrow displays the following screen:

Missing Label Length	5
----------------------	---

(Not included when reduced menu set selected)

From version 3.06 to 3.19A the missing label function worked like this:

If a label dispense takes more than the number of steps set here the labeller will disable, show “Labeller error” and turn on the Bussed Fault Output. A value of 0 allows infinite length, 1 = 256, 2 = 512, 3 = 1024, 4 = 2048, 5 = 4096, 6 = 8192, 7 = 16384 and 8 = 32768 steps.

From version 3.20 on it can work in either of two ways:

If the value entered here is less than 64 the missing label function works as above except that the number of steps is set differently. The number of steps at which the labeller will stop is 256 times the value set here. So a value of 16 gives the same as the old default value of 5 (256 x 16 = 4096). This gives a much more precise way to set the trip point.

If the value is greater than 63 the “no gap skip” style of missing label is implemented. This allows the labeller to skip past missing labels (or blocked label gaps) as if they never happened. It works by simulating the label gaps presence at the number of counts specified here. So the number entered here should be the label length minus the label advance setting. You can enter this manually or by pressing

Enter after the length is displayed in the previous menu. If the actual gap occurs after the gap is simulated, the actual gap position will override the simulated one to maintain correct registration. If you change the advance after setting this value you should redo this setting to cater for the new advance value. If the “gap skip” is done four times consecutively the labeller will disable, show “Consec. Miss Regist.” and turn on the Bussed Fault Output.

Pressing the down arrow displays the following screen:

```
Printer
      Disabled
```

The Printer menu is shown here. Pressing Enter cycles between Disabled and Enabled. Use the “Option Menu” to select the type of printer fitted and the “Option2 Menu” to select the type of printer fault signal. Pressing the down arrow displays the following screen:

(Note: the following six menus may not appear here but in the top level menu if they are enabled.

```
Two Label Spacing
              0
```

The Two Label Spacing setting is displayed here. This setting sets the number of steps to pause between the first and second label of a set. A value of 0 turns this function off. Pressing the down arrow displays the following screen:

```
2 Label 1st Advance
              0
```

The advance setting for the first label of a two label set is displayed here. When two label spacing is turned on in the previous menu this setting controls the stopping position after the first label is dispensed. The normal advance setting is used for the second label. Pressing the down arrow displays the following screen:

```
Jig Delay
              0
```

The Jig Delay setting is displayed here. This setting sets the number of steps between product sensor activation and the activation of the jig solenoid. A value greater than zero enables “Jig Control Mode”. If you select this mode, you must select a mode in the “Spin Up Delay” as well! If Knife mode is selected in the Option2 menu this value cannot be changed from off! Pressing the down arrow displays the following screen:

```
Jig Hold Delay
              0
```

The Jig Hold Delay setting is displayed here. This setting sets the number of steps between the completion of the dispense and the deactivation of the jig solenoid. It is up to the operator to ensure correct product spacing. You must ensure the product is released before the following product is detected by the product sensor or that product will be ignored. This setting is only used when in Jig Control Mode which is enabled by the menu above, so you can leave the value in here when it is disabled. Pressing the down arrow displays the following screen:

Spin Up Delay
0

The Spin Up Delay setting is displayed here. This setting can enable one of two modes. In both modes the sequence is started by the "Jig In" input. A value of 1 puts the InStep into "Jig Only Mode". In this mode, the Jig In sensor simply triggers the normal cycle instead of the product sensor. When a larger value is entered, the "Orient Jig Mode" is turned on. This command sets the number of steps to pause before the registration scanner is enabled. This is to ensure the product is spinning in the jig at the correct speed. In orient jig mode the cycle is initiated by a sensor connected to the "Jig In" input. This initiates the spin up delay. When this is complete, the sensor connected to the "Colour Sensor" input is enabled. When the colour sensor sees a leading edge the normal dispense sequence is started. A value of 0 turns both jig modes off. Pressing the down arrow displays the following screen:

Air Blast Time
0

Simple

The Air Blast Time is displayed here, this sets the air blast time in milliseconds. The air blast is for machines with an air box attachment. The air blast time occurs after the product delay and before the label starts to move. Pressing the down arrow displays the following screen:

Length Measure

Simple

Whilst this menu is displayed the actual dispensed label length in steps is displayed at the completion of every cycle. Pressing Enter when there is a length displayed will calculate the missing label length and load it into the next menu. Pressing the down arrow displays the following screen:

Library Functions

Simple

Pressing the down arrow displays the "Level Three Menus" selection screen further below. Pressing Enter takes you into the Library sub-menu and displays the following screen:

Save to Library No.
0

Simple

This is the first menu in the library sub-menu. Pressing Enter allows you to select the library number to save to with the arrow keys. After selecting, pressing Enter saves all of the data from the current data memory and displays the "Library Functions" menu. (There is no library number zero, it is provided to allow a way to "escape" without saving.) Pressing the down arrow displays the following screen:

Read from Lib No.
0

Simple

This is the second menu in the library sub-menu. Pressing Enter allows you to select the library number to read from. After selecting, pressing Enter reads the library and saves it to the current data memory. If after pressing Enter, the "Library Functions" menu is not displayed, the data in the selected menu was invalid. Select another library number or select 0 to escape from this menu. Pressing the down arrow displays the "Library Functions" menu.

Level Three Menus

Pressing Enter takes you to level three menus and displays the "Acceleration" menu. Pressing the down arrow displays the following screen:

Level One Menus

Simple

Pressing Enter takes you to the level one menus and displays the "Label Counter" menu. Pressing the down arrow displays the Printer menu.

Level Three Menus

```
Acceleration
          3
```

The Acceleration setting is displayed here. This menu selects one of six acceleration ramp profiles. A value of 5 is the softest, 3 is normal. Pressing the down arrow displays the following screen:

```
Deceleration
          10
```

This is the second menu in level three. The Deceleration setting is displayed here. This menu adjusts the number of steps to decelerate for. This setting is read-only at present. Pressing the down arrow displays the following screen:

```
Inputs:  PGDSPEJC
          00000000
```

This is the third menu in level three. The input status is displayed here. A value of 1 indicates the input is on, 0 is off. The letters above the value indicate what the input is used for.

P – Product Sensor

G – Gap Sensor

D – Disable Input (Fault In)

S – Servo OK

P – Printer OK

E – End of Reel Input

J – Jig In / Product Gate Input

C – Colour Sensor

The display is not live, pressing Enter updates the display.

Pressing the down arrow displays the following screen:

```
Outputs: XFABJSEC
          00000000
```

The output status is displayed here. A value of 1 indicates the output is on, 0 is off. The letters above the value indicate what the output is used for.

X – Spare

F – Fault Output

A – Air Assist Output

B – Air Blast Output

J – Jig Solenoid Output

S – Feedscrew Enable Output

E – Servo Enable / Stepper Boost Output

C – Coder (Printer) Output

The display is not live, pressing Enter updates the display. As of version 3.21 set/reset of outputs for testing is allowed. This uses the new bit editing method introduced in this version. With this new version pressing Enter takes you into edit mode as usual however the arrow keys move the cursor up and down through the different bit positions. When the Enter key is pressed it alternatively set/resets the highlighted bit. To exit edit mode you must move the cursor back to the arrow at the right of the value and press Enter.

Pressing the down arrow displays the following screen:

```
Master Speed
          0
```

The speed of the master encoder is displayed here. It is used to check the operation of the master encoder. If the master encoder rate is too fast “fast” will be shown. Extremely slow encoder rates cause “Slow” to be displayed. If a dispense has been attempted when the master encoder is stopped it will display “Stopped!” The display is not live; you need to press Enter to update display. Pressing the down arrow displays the following screen:

```
Options: GSGEC421
         00000000
```

The option status is displayed here. A value of 1 indicates the option is on, 0 is off. The letters above the value indicate what the input is used for.

G – Gate Signal Required

S – Servo Mode (Not Stepper). On for speed compensation and servo enable. Off for stepper drives.

G – SIG drive compensation. Must select servo mode above as well!

E – Enable at Power On

C – Moving Type Coder e.g. inkjet (0 = Stationary Type e.g. stamping hot foil)

421 – Serial Address Select (Set bits to total to desired address, all off = 8)

Pressing Enter takes you into bit edit mode. Refer to the output menu for details on ‘bit edit mode’.

Pressing the down arrow displays the following screen:

```
Option2: EMCRBSPF
         00000000
```

The second option status menu is displayed here. A value of 1 indicates the option is on, 0 is off. The letters above the value indicate what the input is used for.

E – End of Reel Mode. When on selects reel turning detection type and when off selects reel diameter low or no web type detection. Set to 0 if no end of reel sensor is fitted. Refer to EOR menu.

M – 1000M Mode. When on changes the functions of the Printer OK and Fault In inputs. Print OK changes to Safety Circuit Activated and Fault In changes to External Enable.

C – Counter Memory. If the counter memory option is installed it should be enabled here. Enabling this function prevents serial communications from working! Was labelled M in V3.18.

R – Reduced (Simple) Menu Mode. Prevents many of the less often used menus from appearing and stops the automatic re-arranging of them depending whether they are enabled.

B – Stepper Boost. When on changes the servo enable output function to a stepper drive boost.

S – Servo OK input polarity. When on here the Servo OK input is off = OK. Can be used when no servo ok signal is available. (i.e. in a Monitron)

P – Printer Fault polarity. When the printer is enabled in level 2 the Printer Fault input becomes active.

The level that causes labelling to be stopped is entered here. 0 = on, 1 = off.

F – Fixed Pull Mode. This is different from InStep I fixed pull mode, it is triggered by the product scanner.

Pressing Enter takes you into bit edit mode. Refer to the output menu for details on ‘bit edit mode’.

Pressing the down arrow displays the following screen:

```
AnlgOut: ?GIOEVCF
Options: 00000000
```

The analogue output option status is displayed here. The settings are only relevant if the Analogue Output Option Board has been fitted. A value of 1 indicates the option is on, 0 is off. The letters above the value indicate what the input is used for.

G – Guarding closed input monitored. Not implemented!

I – Infeed Low Sensor monitored.

O – Outfeed High Sensor monitored.

E – Turn off Screw Enable/Servotron OK output when disabled. Implemented in V S3.23

V – Vacuum Belt Speed Adjustment enabled.

C – Conveyor Speed Adjustment enabled.

F – Feedscrew Speed Adjustment enabled.

When the speed adjustments are disabled they are shutdown and the menu screens removed.

Refer to the Analogue Output Option Board manual for further details.

Pressing Enter takes you into bit edit mode. Refer to the output menu for details on ‘bit edit mode’.

Pressing the down arrow displays the following screen:

```
Level Two Menus
```

Pressing Enter takes you to level two menus and displays the “Manual Dispense” menu. Pressing the down arrow displays the following screen:

Level One Menus

Pressing Enter takes you to the level one menus and displays the “Label Counter” menu. Pressing the down arrow rolls around and displays the Acceleration menu.

Fault Screens

The following screens appear when the fault occurs. If multiple faults occur only the first one is displayed. If subsequent faults are still present when earlier ones are reset they will then be displayed. If the fault is rectified the screen can be cleared and the labeller re-enabled by pressing Enter. If you would like to review your settings without resetting, the first press of either arrow key will bring back the menu that was present before the fault occurred. You can then move around the menus as usual. Afterwards, you can re-enable the labelling by using the “Labelling Enable” menu in Level 1.

Labeller Error!
Press Enter to Reset

This screen indicates that the servomotor has moved further than that set by the missing label length. It is usually caused by a wrongly setup gap sensor or slipping drive rollers. It can always be reset immediately. Refer to the “Missing Label Length” menu in level two for adjustment.

Consec. Miss Regist.
Press Enter to Reset

This screen indicates that the labeller has had to simulate the gap sensor more than three times in a row. It is usually caused by a wrongly setup gap sensor or slipping drive rollers. It can always be reset immediately. Refer to the “Missing Label Length” menu in level two for adjustment.

Printer Error!
Press Enter to Reset

Whenever the printer is enabled (and the 1000M bit in Option2 menu is off) the printer fault signal is also enabled. The sense of the input is controlled by a bit in option port 2 or by the ‘D’ command. If no printer fault signal is available it should be set to off = OK (default). The fault signal must be removed before it can be reset.

External Fault!
Press Enter to Reset

This screen appears when the Fault In input is activated (the 1000M bit in Option2 menu must be off). This input is usually tied together with all of the other Fault In/Fault Outs on the machine so that a fault on one label head will disable all heads.

Servodrive Error!
Press Enter to Reset

This screen appears when the connected servo drive has indicated a fault. You usually must power down the servodrive to reset the fault. If the fault occurs often it will be necessary to open the enclosure to check the fault code indicated on the front of the servodrive. Refer to the servodrive manual for the fault codes meaning and its remedy. It is usually caused by a web jam up.

End of Label Reel!
Press Enter to Reset

This screen appears when the “End of Reel” has been detected. It can be reset straight away. Refer to Option2 menu and End of Reel Count menu for correct type setup and count setting.

Orientation Error!
Press Enter to Reset

As of version 3.17C and when in Jig Control and Orient Mode, the product sensor is monitored while the jig is closed and should it be activated again the jig opens and this fault is displayed. At the time of jig closure the product sensor input is checked. If it is on (usually caused by large products in the jig) then this failure checking is disabled as there is no way to check for subsequent products coming. Whether this checking is disabled or not you can always release a jig stuck in due to failure of the colour sensor to detect the mark by pushing any button!


```
Safety Circuit Open!
Press Enter to Reset
```

This screen appears when the “1000M” bit in Option2 is set and the ‘Print OK’ input is on. In this setup a N.C. contact on a safety contactor is connected to what is usually the ‘Print OK’ input. You must reset the safety circuit before you can re-enable.

```
Labelling Disabled
By External Input
```

When the “1000M” bit is set the ‘Fault In’ input becomes the External Disable Input. This message is displayed when the input is on and automatically returns to the previous menu when turned off. In this mode, this input can also be used to reset other faults!

Other fault screens may appear depending on the option card fitted and which functions are enabled.

Initialisation Menu

This menu can only be entered during power up. It will automatically appear if the controller detects invalid data in the current data memory or it can be forced to appear if Enter is pressed and held during the initial screen that displays the version number information. It will appear as either of the two following screens:

```
Enter Pressed
Use ^ to make choice
```

or

```
EEPROM Data Invalid!
Use ^ to make choice
```

If the up arrow is pressed, the following screen will appear:

```
Enter Pressed
Erase Libraries
```

This is the first choice in the initialisation menus. Pressing Enter causes all of the Library data to be erased then the first initialisation menu is shown again. Pressing the up arrow causes the next menu to be displayed as follows:

```
Enter Pressed
Reinitialise?
```

This is the second choice in the initialisation menus. Pressing enter drops into the type selection sub-menu. The first menu is as follows:

```
Select Type
Use ^ to make choice
```

If the up arrow is pressed, the following screen will appear:

```
Select Type
Servotron
```

Pressing Enter causes all of the current data to be reset to default values and then display the first menu in level one. Because of this, if you want to erase libraries and reinitialise you must erase libraries first. Pressing the up arrow will cycle through the following selections: “Servotron 2001”, “Model 500”, “Monitron”, etc, “Do Nothing” and back to “Servotron”.

Pressing the up arrow causes the next menu to be displayed as follows:

```
Enter Pressed
Do Nothing
```

This is the third choice in the initialisation menus. Pressing Enter simply displays the first menu in level one and as the menu suggests, does nothing. If the entry into the initialisation menu was caused by invalid data you can't use this option, but must select reinitialise. Pressing the up arrow causes the first initialisation menu to be redisplayed.

Inputs

All inputs are found on connector CONN1. They are selectable by jumpers on the InStep II PCB for NPN (1 to 2) or PNP (2 to 3) input devices. The function of each input follows.

IN1 – Colour Sensor (Product Sensor 2)

This input only functions in Orientation Mode. It triggers the labelling cycle just as the normal product scanner does but only after the orient part of the cycle is complete. See jumper J1 for input polarity selection. Terminal 1 on CONN1.

IN2 – Jig In Sensor/Product Gate

This input is usually a proximity detector mounted on the orientation jig to indicate when the jig is closed. It initiates the spin up delay in orient jig mode. If the Gate Input is selected on the option port this input becomes the product sensor gate input. In this mode this input must be on before a product detection will start the dispense cycle. See jumper J2 for input polarity selection. Terminal 2 on CONN1.

IN3 – End of Reel

This input was marked “Fixed Pull”, as this was its use prior to Ver 3.04. Now this input is usually connected to a sensor that detects a low level of labels on the unwind reel. Refer to the description of ‘End of Reel Count’ menu. See jumper J3 for input polarity selection. Terminal 3 on CONN1.

IN4 – Printer OK/Safety Circuit Monitor

If the “1000M” bit in Option2 is off, this input is connected to the printer OK/fault output of the printer controlled by the Servotron. When the printer is enabled by the printer menu or the ‘D’ command with an odd value this input must be on otherwise labelling is disabled and the “Printer Error” is displayed. If an even value is used in D the input must be off for printer OK. The ‘P’ bit in Option Port 2 also controls the polarity. As of V3.19A the printer fault input is only checked just after the label dispense is completed. This allows it to possibly serve as an actual print confirmation input (from a contrast scanner for instance) or just a simple printer fault signal monitor. If the “1000M” bit in Option2 is set this input becomes the Safety Circuit Monitor. In his mode, if the input is on, labelling is disabled and the “Safety Circuit Open” fault is displayed. See jumper J4 for input polarity selection. Terminal 4 of CONN1.

IN5 – Servodrive OK

This input is connected internally to the servodrive fitted inside the Servotron. It disables labelling and shows a fault screen when it is off. When a Mitsubishi drive is fitted the polarity jumper J5 should be set to NPN. This input is not brought out to the rear panel connectors.

IN6 – Fault In (Bussed Fault In)/External Disable

If the “1000M” bit in Option2 is off, this input disables the labelling when on and displays the “External Fault” message. If the “1000M” bit in Option2 is set this input becomes the “External Disable” input. In this mode the “Labelling Disabled by External Input” message is displayed and it automatically resets when the input is tuned off. See J6 for input polarity selection. Terminal 5 on CONN1.

Product - Product Sensor

This input initiates the labelling sequence. It starts with a transition from off to on of this input. See jumper J7 for input polarity selection. Terminal 8 on CONN1.

Gap Sens - Gap Sensor

This is the registration input. It is normally connected to a fork sensor that detects the gap between the labels on the backing paper. The label advance starts counting with an off to on transition of this input. See jumper J8 for input polarity selection. Terminal 9 on CONN1.

Encoder - Master Encoder

This is where the encoder for the product speed is connected. The encoder is usually coupled to the conveyor or vacuum belt of the machine. See jumper J12 and J13 for input polarity selection and J11 for voltage. The pulses per rev of the encoder and its gearing to the conveyor / belt should be selected so that the rate is the same as the step rate of the motor. It is best to be on the low side of one to one if this cannot be achieved. The encoder should have an open collector 5 or 24VDC output. Terminal 10 on CONN1.

Outputs

All outputs are found on connector CONN2. They are selectable for NPN or PNP however they must all be one or the other. Selection is made by changing IC9. For NPN use ULN2803A, for PNP use UDN2981A. Jumpers J9 and J10 must be set to suit.

OUT1 – Coder (Printer)

This output is the start trigger for a date coder etc. Option Menu selects whether the coder is of the type that prints while the web is stationary (e.g. hot stamp) or moving (e.g. ink jet). Terminal 1 on CONN2.

OUT3 – Feedscrew Enable/Servotron OK/Winder Enable Output (Mislabs Out)

This output terminal was marked “Mislabs Out” on early rear panels as this was its purpose prior to V3.08. As of V3.08 this output is provided to enable the feedscrew. It is on whenever there are no faults and no level pauses from the high outfeed and low infeed sensors. As of version S3.14 this output becomes an OK output whenever the level control are not enabled in the Analogue setup. It is on whenever there are no faults present. The analogue output option board is required for the level sensor inputs. As of version S3.23 a bit in Analogue Setup controls whether this output goes off when labelling is disabled via the menu in level one. Terminal 2 on CONN2.

OUT4 – Jig Solenoid

This output controls the solenoid that closes the orient jig. Implemented in V3.02. Pin 3 on CONN2.

OUT5 – Air Blast

When an air blast time is entered in the menu or with the K command, this output is turned on at the end of the product delay and before the servo starts to move. Terminal 6 on CONN2.

OUT6 – Air Assist

This output is turned on at the start of the servo moving and off at the beginning of deceleration. Terminal 7 on CONN2.

OUT7 – Bussed Fault Out

This output is turned on when there is a labeller fault, printer fault, servo fault, end of reel or Fault In is on. It only goes off when the fault has been reset or labelling is re-enabled. Terminal 8 on CONN2.

Connectors

Rear Panel Connector CONN1 - Inputs

Pin Number	Signal	Description
1	IN1	Product Sensor 2. Registration mark scanner, used in orient jig mode.
2	IN2	Jig In/Product Gate input. Use depends on selected mode.
3	IN3	End of Reel input. End of Reel sensor is connected here.
4	IN4	Printer OK/Safety Circuit Monitor input. Use depends on M1000 bit in Option2.
5	IN6	External Fault/External Disable input. Use depends on M1000 bit in Option2.
6	+24V	24V provided for sensor power.
7	0V	0V provided for sensor power.
8	PROD	Product detection scanner input.
9	GAP	Label gap scanner input.
10	ENC	Master encoder input. 24 or 5 volt jumper selectable.
11	+5V	5V provided for encoder power
12	0V	0V provided for encoder power

Rear Panel Connector CONN2 - Outputs

Pin Number	Signal	Description
1	OUT1	Printer output. Moving or stationary type selectable.
2	OUT3	Feedscrew Enable/Servotron OK output. Use depends on Analog Options.
3	OUT4	Jig Solenoid/Knife Up Output. Connects to solenoid that controls same.
4	+24V	24 volt power supply for output devices.
5	0V	0 volt power supply for output devices.
6	OUT5	Air Blast/Knife Down output. Connects to air blast/knife down solenoid
7	OUT6	Air Assist output. Connects to air assist solenoid
8	OUT7	Fault output. Turned on when fault detected. Can be chained to other units
9	+24V	24 volt power supply for output devices.
10	0V	0 volt power supply for output devices.
11	OPT1	Depends on option card fitted. Refer Option Card manual
12	OPT2	Depends on option card fitted. Refer Option Card manual

Rear Panel Connector CONN3 is used for connection to the option card, if fitted. For terminal descriptions, refer to the appropriate Option Card manual.

Rear Panel Connector CONN4 – Motor Power

Pin Number	Signal	Motor Cable Colour	Intermediate Cable Colour
1	Motor U	Red	Brown
2	Motor V	White	Black
3	Motor W	Black	Blue
4	Earth	Green/Yellow	Green/Yellow

Configuration

InStep II PCB Jumper Descriptions

Jumper	Description	Default
J1 to J8	These three point jumpers select the polarity of the signal required to operate the inputs. Jump 1 to 2 for sinking (NPN) type input devices. Jump 2 to 3 for sourcing (PNP) type input devices. J1 to J6 correspond to input 1 to 6 respectively. J7 is for the product sensor input. J8 is for the label sensor input.	1 to 2 jumpered (J5 should always be set to 1 to 2 when a Mitsubishi drive is fitted!)
J9 and J10	These jumpers are set to match the type of output driver IC installed in position IC9. Jump both 1 to 2 for NPN type IC (ULN2803A) Jump both 2 to 3 for PNP type IC (UDN2981A) Note: jumpers must be set correctly or damage will result!	1 to 2 jumpered
J11	Install Jumper 11 when 5 volt encoder is used. J12/13 must be in PNP configuration when this jumper is installed!	Not fitted
J12 and J13	These jumpers are set to match the polarity of the output of the master encoder connected to terminal 11. Jumper J12 and J13 1 to 2 for NPN output encoders. Jumper J13 2 to 3 and J12/1 to J13/1 for PNP output encoders.	J12, 1 to 2 jumpered J13, 1 to 2 jumpered
J14 to J24	These jumpers set the master encoder divisor. J14 is divide by one; J15 is divide by 2 through to J24, which is divide by 1024. Only one jumper in this set to be installed!	J14 installed
J25	Selects the function on pin 28 on P1. Refer to option manual.	1 to 2 jumpered
J26	Selects whether to bypass the encoders optocoupler. 1 to 2 is to use optocoupler, 2 to 3 is to bypass the optocoupler.	1 to 2 jumpered

Rear Panel PCB Jumper Descriptions

Jumper	Description	Default
J1	This jumper adapts the inputs of the servodrive to the outputs of the InStep II PCB. It should be set to match the output IC fitted on it. Jump 1 to 2 for NPN, 2 to 3 for PNP.	1 to 2 jumpered
J2	This jumper selects the direction of the servomotor. Jump 1 to 2 for CW, 2 to 3 for CCW.	2 to 3 jumpered

LCD Contrast

Near the bottom corner of the InStep II PCB there is a small adjustment potentiometer to adjust the liquid crystal displays contrast. The display contrast is directly affected by the ambient temperature and as such may require adjustment in extreme temperature environments.

Servodrive Parameters

The Servotron usually comes fitted with a Mitsubishi MR-C40A servodrive. The parameters of this drive are set at manufacture. If it becomes necessary to alter or reload them please consult Impresstik Machinery Pty Ltd.

AC Input Socket

The AC power input module takes an IEC style power cable. The fuse fitted inside this module should be a 5 amp Antisurge (T) rated type. The input voltage is determined by the servodrive fitted inside, this is 200 to 240Vac 50/60Hz for the Mitsubishi. If no servo is fitted inside the box the input voltage range is 85 to 265Vac, 47 to 63Hz.

InStep Labelling Modes and Sequence Chart

Step No.	Step	Comments
1	Product Input On	All modes except Jig Only/Orient and Man Dispense
2	Product Gate Input On ¹	Only if selected on option port (InStep I J31 or InStep II bit 7)
3	Jig Delay	Jig Control Mode Only ² (Jig Delay > 0)
4	Jig Solenoid Output On	Jig Control Mode Only (Jig Delay > 0)
5	Jig In Input Off ^{3,4} (Jig In)	Jig modes only (Jig Only/Orient Mode starts here) (S U D > 0)
6	Spin Up Delay ⁵	Orient jig mode only (Spin Up Delay > 1)
7	Colour Sensor/Prod 2 Input ⁶	Orient jig mode only (Spin Up Delay > 1)
8	Label Position Delay	All modes except manual release
9	Air Blast Output On	Air Blast Mode Only (Man Dispense starts here) (AB Time > 0)
10	Air Blast Time	Air Blast Mode Only (Air Blast Time > 0)
11	Air Blast Output Off	Air Blast Mode Only (Air Blast Time > 0)
12	Air Assist Output On	All modes
13	Acceleration	All modes (Except 2 nd label of two label set as of V3.07)
14	Printer Output Off/On	Only if Printer enabled (D > 1) (Off/On selected on option port)
15	Run in Sync or Set Speed	All modes
16	Gap Sensor Input On	All modes
17	Label Advance ⁷	All modes (Gets setting from t command on 1 st label of 2 label)
18	Air Assist Output Off	All modes
19	Two Label Spacing Delay	Two Label Mode Only (Two Label Spacing > 0)
20	Back to step 9 on first pass	Two Label Mode Only (Two Label Spacing > 0)
21	Deceleration	All modes (Prior to V1.18C was done on 1 st label of 2 label set)
22	Knife Down On/Up Off	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
23	Knife Down Time	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
24	Knife Up On/Down Off	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
25	Jig Hold Delay	Jig Control Mode Only (Jig Delay > 0)
26	Jig Solenoid Output Off	Jig Control Mode Only (Jig Delay > 0)
27	Printer Output On/Off	Only if Printer enabled (D > 1) (Off/On selected on option port)
28	Product Input Enabled	Only if labelling still enabled (E = 1)

¹ If selected, the Gate Input must be on at the instant of the product sensor coming on or the sequence will restart. Therefore, the timing is always controlled by the Product Sensor Input.

² When using Jig Control Mode you must select either Jig Only or Orient Jig Mode as well. If not, the sequence will stall after the Jig Solenoid is turned on.

³ The sense of the Jig In Sensor Input has been changed so that off = jig in. This was done to allow the use of a more standard N.O. proximity sensor in the orient jig mechanism.

⁴ Because the Product Gate and Jig In share the same input, it is not practical to have both enabled at the same time. However, this is not normally a limitation as gating is usually only used on a rotary type machine where an orientation jig cannot be fitted

⁵ The Spin Up Delay is used to ensure the product is spinning smoothly in the jig before the Colour Sensor/Prod 2 is enabled. This prevents false triggers from the Colour Sensor.

⁶ Sending anything over serial port or pressing any button while waiting for the colour sensor input to be activated will cause the sequence to reset without dispensing. As of version S3.17C re-activation of product scanner while the previous product is still in the jig will cause an 'Orientation Error'.

⁷ In Fixed pull mode steps 15 and 16 are bypassed and the advance is loaded with the fixed pull length minus the acceleration length. It is not intended that it be used in conjunction with the jig modes or two label mode.

Servotron Version Update Summary

For version history prior to V3.15 please refer to the Servotron User Manual up to V3.14B

Version S 3.15 - 16/07/2002

- Changes:** Comms input buffer is cleared on reception of a semicolon header anywhere in the string. Master Speed display changed to be scaled like set speed (i.e. 9999 is a very fast speed) Also too fast displays "Fast", very slow "Slow" and stopped "Stopped!"
Printer menu now only Enabled/Disabled. Type set in Option menu. In menus that disable with a value of zero they now say "Off". Also some menus swap between level two and level one depending if they are enabled.
- Fixes:** Fixed problem where Analogue options enabled or disabled were not actually done until next power up. Now done when leave edit mode.
Better debouncing of button presses. Fixed a small missing label problem.
- Additions:** Sending a backspace character deletes the previous character except for header and address.
Added Counter menu and Option2 menus.

Version S 3.15A - 16/08/2002

- Changes:** None.
- Fixes:** Fixed a problem where if labelling is disabled (by a fault or by E0) during a dispense and then re-enabled before that label finishes (usually when master has stopped) it would cause a missing label fault as the gap sensor was disabled by E1. Also fixed a problem where if the printer fault polarity is changed when printer already enabled the new setting s not saved.
- Additions:** None.

Version S 3.16 - 29/08/2002

- Changes:** Changed so Servo OK input works in stepper and servo modes of Servotron. Changed Stepper boost to function in all modes if selected in Option2. There are now 4 versions of Servotron firmware. 'T' for 2001, 'S' for Servotron, 'L' for Lite (Model 500) and 'M' for Monitron. The only difference is the default selections made on a re-initialise.
- Fixes:** Fixed a problem with "Fixed Pull" introduced in 3.15. Also made Master Speed display "Stopped" if powered up with no encoder or stopped encoder.
- Additions:** Added 'w' command to set OPTION2.

Version S 3.16F - 22/10/2002

- Changes:** Changed CPU frequency from 4.9MHz to 7.3MHz and rescaled delays to remain the same.
- Fixes:** Fixed problem with 15ms delay after ready for next. Now only happens if prod still on.
- Additions:** None.

Version S 3.17 - 19/11/2002

- Changes:** Changed Reinitialise so that you drop into a sub-menu that allows the selection of type of controller to initialise to. This replaces the selective assembly scheme started in V3.16. This means there is only two versions of software (InStep I and Servotron) and all InStep II versions are prefixed 'S'.
- Fixes:** Changed default set speed from 300hex (9341 dec.) to 480hex (8957 dec.) to correct actual speed back to the same as before CPU frequency change in V3.16F.
- Additions:** None.

Version S 3.17A - 03/12/2002

- Changes:** None.
- Fixes:** Fixed a problem with writing to outputs continuously instead of only when needed. Should be transparent to user.
- Additions:** None.

Version S 3.17B - 17/01/2003

No changes applicable to 'S' version.

Version S 3.17C - 10/03/2003

Changes: None.

Fixes: Fixed some problems with jig/orientation modes. In these modes when label position was zero sometimes label was not dispensed. Also fixed a fixed delay at end of spin up that could cause position errors under certain conditions. Also fixed spin up testing for a value of 1, it only used to check the bottom byte for a 1 so 257 looked like 1.

Additions: Added orientation error fault. If a product re-breaks the product scanner while the previous product is still in the jig the machine is stopped and an error displayed.

Version S 3.18 - 27/03/2003

Changes: None.

Fixes: None.

Additions: Added Knife mode for a cutter to operate at the end of dispenses. Set in Options2 and uses air blast menu/setting and output for knife down and jig solenoid output for knife up. So if this mode is selected you can't use air blast or jig modes. Also added support for the label counter memory option. It needs to be installed and enabled via bit 5 of Option2. If enabled, serial communications are disabled!

Version S 3.19 - 16/05/2003

Changes: Letter above counter memory bit in Option2 changed from M to C. Changed Reinitialise selection "Reeltek Protag" to "1000M Tagger". Now sets E, M and K. (was only K)

Fixes: Added 45ms delay after knife up in knife mode. This prevents label starting next dispense before knife has actually gone up.

Additions: Added two bits to Option2. One is M for 1000M mode. This changes the function of two of the inputs. One is Print OK input changes to Safety Circuit Monitor and the other is Fault In changes to External Disable. The other bit is E for EOR mode. When off this selects EOR input on equals start counting to EOR error. When off, this selects EOR input on resets EOR counter. Also added EOR count setting menu in level two. It also indicates the live EOR count value. Added "1000M Labels" to re-init menu. Sets E and M.

Version S 3.19A - 29/05/2003

Changes: Printer OK test changed to only do a one shot test at the completion of label dispense. This allows actual print presence test with contrast scanner while still allowing printer fault relay testing as before.

Fixes: None.

Additions: None.

Version S 3.20 - 24/06/2003

Changes: None.

Fixes: None.

Additions: Added full "no gap skipping" to missing label function. Refer to Missing Label Menu for further details. Also added teach function to Label Measure Menu.

Version S 3.21 - 17/08/2003

Changes: None.

Fixes: Fixed minor problem where if in edit mode when an error message appears, the left arrow is not redisplayed to the right of the value when the menu is redisplayed.

Additions: Added the ability to set/reset individual bits in the four bit setting type menus. This replaces the up/down counting in binary and allows editing of the outputs.

Version S 3.22 - 10/10/2003

- Changes:** Changed the range of adjustment of the air blast from 0 to 255 to 0 to 8191 milliseconds.
- Fixes:** Fixed problem with end of reel in low level sensor mode. Countdown now starts with one activation of input and latches until count expired. Previously only counted while input is on, this does not work properly with a sensor shining through a slot in the reel disc.
- Additions:** None.

Version S 3.22A - 15/11/2003

- Changes:** None.
- Fixes:** Fixed major problem where the sync ratio setting was saved to EEPROM in the location used by the air blast. This problem was created in V 3.22. Does not affect InStep I version.
- Additions:** None.

Version S 3.22B - 14/12/2003

- Changes:** None.
- Fixes:** Fixed problem where missing label of zero did not disable missing label detection. This error was introduced in V3.20.
- Additions:** None.

Version S 3.22C - 19/01/2003

- Changes:** None.
- Fixes:** Fixed manual dispense, it could be re-triggered before the previous cycle had finished. This is most apparent when using air blast as a second air blast is done on re-trigger.
- Additions:** None.

Version S 3.22D - 29/03/2004

- Changes:** None.
- Fixes:** Fixed a problem with counter memory option. On power up with memory fitted can get EEPROM corrupt message when it isn't. This was caused by NOVRAM only being disabled after EEPROM was read causing corruption of EEPROM data reads.
- Additions:** None.

Version S 3.23 - 17/06/2004

- Changes:** None.
- Fixes:** Fixed a problem with the 'Q' command. If issued when gap was on from start of dispense it would not work.
- Additions:** Added 'q' command, this just does deceleration and stops. (Q simulates gap)
Added bit to Analogue Setup menu; bit 3 now causes Screw Enable/Servotron OK output to go off when labelling disabled. Allow output to be used as unwind/rewind enable.

Version S 3.24 - 13/12/2004

- Changes:** Changed transmit to be a background task. Also added a forced 20ms turnaround delay between the end of receiving and the start of transmitting the response. This helps prevent output pulse glitches and aids in half-duplex communications to hosts with a slow turnaround time. e.g. PC's running Windows™ and buggy PLC's
- Fixes:** None.
- Additions:** None.

Version S 3.25 - 06/05/2005

- Changes:** Added "no gap skip" selection and serial number readout to serial commands.
- Fixes:** Scans inputs on Analogue Option Board and 16Hz (was 1Hz).
- Additions:** Implemented Low Infeed Level on Analogue input option.

Version S 3.25d - 05/04/2006 Special for Model 500 Tamp Labeller

Changes: Air Blast Menu becomes Apply Cyl Down Time. Air Blast fixed at one second. Bussed fault in becomes cylinder up switch input.

Fixes: None.

Additions: None.

Version S 3.25Q - 18/06/2006

Changes: Special version where product sensor debounce is only 2ms for trailing edges.

Fixes: None.

Additions: None.

V3.25F (20/02/2007) Is a test version only for using FRAM in place of NOVRAM for counter memory.

Version S 3.26 - 16/03/2007

Changes: Removed knife mode from Option2 and changed to reduced (simple) menu mode.

Fixes: Fixed issue if spinup delay set before jig delay set (used to lock up). Fixed a problem when setting spinup or U command while running.

Additions: Allows manual dispense to occur when in sync mode and master stopped by temporarily changing to set speed for 1 label. This also allows completion of a stalled dispense. Displays CPU board serial number on power up. Added two more automatic configurations to startup menu (both simple menu, with and without encoder). Added sub-menus under label counter menu to prevent accidental resetting of counter.

Version S 3.26A - 21/03/2007

Changes: Changed hiout and loin reads on analogue option card to write to all DAC's in order. This is to prevent very seldom occurrence of DAC's going to 0. (unclear if this is required or it works)

Fixes: None.

Additions: None.

Version S 3.26B - 11/11/2007

Changes: None.

Fixes: Fixed some wrong menu jumps when not in simple menu mode.

Additions: None.

Version S 3.26C - 19/11/2007

Changes: None.

Fixes: Fixed a problem with SUSCHK when changing from Spinup of 1 to more than 1.

Additions: None.

Version S 3.26D - 21/01/2008

Changes: This is simply 3.26C assembled with Jig input invert disabled. Done for Unitron conversion.

Fixes: None.

Additions: None.

Version S 3.26E - 15/02/2008 (Based on version 3.26C)

Changes: None.

Fixes: Fixed problem when in simple menu mode and Air Blast not enabled. Up from Length Measure went to Air Blast.

Additions: None.

Version S 3.26E should be the last version as the Servotron has been made obsolete by the Commander keypad system.